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Foxtail Palm, *Wodyetia bifurcata*

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Foxtail palm, *Wodyetia bifurcata* (L.) A.K. Irvine [pronounced wod-YET-ee-ah by-foor-KAHT-a], is a member of the Arecaceae, or palm, family. The genus is so named in honor of "Wodyeti," an Australian aborigine who was the last man of his tribe to have knowledge of the flora and fauna of its region. The epithet bifurcata is Latin for "twice divided," in reference to its leaves. The plant is native to Australia and is the only species within its genus (a monotypic, or single-species, genus), and it occurs naturally in the Melville Range, near Baythurst Bay on Cape York Peninsula in northeastern Queensland. Discovered in 1978 and formally described in 1983, foxtail palms have received popular attention in the nursery and landscape industries because of their extraordinary beauty, fast growth, and adaptability.

Identifying characteristics

This monocot plant has a solitary growth habit, with trunks that are slender, gray, swollen at the base, and ringed with leaf scars. It has a pale green crownshaft and a crown of 8–10 leaves that range in length from 8 to 10 feet. The leaves are pinnately compound (feather-leaved), with several hundred fishtail leaflets attached along the rachis, or leaf rib, giving them a foxtail-like appearance. The leaflets are deep green with a silvery underside and are about 6 inches long and 2 inches wide.

Foxtail palms reach maturity at around 12 years of age, at which time they are able to produce inflorescences. The inflorescence, which arises at the base of the crownshaft, bears white flowers. Both male and female flowers are borne, thus this plant is classified as monoecious, capable of self-fertilization. Fertilized female flowers produce large, oval-shaped, green fruits that turn orange-red at maturity. Mature fruits are approximately 1¼ inches wide and 2¼ inches long with a single seed within each fruit.

Maintenance and environmental requirements

Although it has a deep root system, the foxtail palm is only moderately tolerant of drought. If conditions are dry for a long period, leaves of these palms become chlorotic, and growth is slowed. Foxtail palms grow rapidly in full sun to partial shade. They can grow in a wide range of soils (pH 5.6–7.8) as long as the medium is well drained. Foxtail palms are also relatively tolerant of wind and salt.

Pruning is not necessary, as these palms are self-cleaning and naturally drop their old leaves. However, if planted in a high-traffic area,

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it is best to monitor the lower, older leaves to prevent potential injury from falling leaves. Natural senescence of healthy old palm leaves takes only a few days, as they turn from green to yellow and finally die and fall from the plant.

Certain nutrient elements, such as nitrogen (N), potassium (K), magnesium (Mg), and manganese (Mn) are consistently lacking in most Hawai'i soil types. However, certain acidic soils in O'ahu's North Shore and central areas can be high in Mn. This condition can be corrected with the addition of lime in the form of $Ca(OH)_2$ (hydrated lime) or $CaCO_3$ (finely ground limestone). In general, for soils high in Mn it is best to avoid applications of organic soil amendments, practices that lead to poor soil drainage, and irrigation practices that lead to flooding. For more information on these soils, see Hue et al., 1988, in the References section on p. 4.

In most soils, where manganese toxicity is not a factor, use a well balanced palm fertilizer in the range of approximately a 3:1:3 NPK ratio and containing Mg, Mn, and other trace elements. It is desirable that N, and especially K and Mg, be in controlled-release forms such as resin- or sulfur-coated products, because soluble forms of nutrients readily leach through the soil beyond the rooting zone. Research has shown that controlled-release fertilizers are more effective on palms in the landscape than rapid-release, readily soluble fertilizers. Formulations appropriate for foxtail palms are Scotts' Osmocote® Plus, Florikan's 13-5-11 Nutricote®, Simplot's Best® Palm Plus 13-5-8, or other equivalent palm fertilizer products that contain micronutrients in addition to N, P, and K. Some of these come in various formulations that release nutrients over different time periods, so it is recommended that they be applied according to the manufacturer's recommended rates. If quick-release, water-soluble formulations must be used, they should be applied frequently (at least monthly) and at low rates (¾ lb/100 sq ft) to compensate for the potential for rapid leaching of their nutrients.

Evenly broadcasting controlled-release fertilizer to the area of ground below the canopy is recommended over foliar or quick-release fertilizer applications, because these latter are rather inefficient for providing macronutrients such as N, K, and Mg. Because newly emerging roots occur near the base of the palm trunk, care should be taken to ensure that the fertilizer is not in direct contact with the trunk base, so that the fertilizer does not burn the roots.

For foxtail palms growing in containers, it is recommended that a controlled-release fertilizer having an NPK ratio of approximately 3:1:2 be used. An 18-6-12 or similar controlled-release formulation may be applied to the surface (again, keeping the fertilizer clear from contact with the base of the palm). It is best to follow the manufacturer's label for the rate of application. It is also best to avoid allowing the containerized palm to become pot-bound. Otherwise, insects will invade dry tissue, and disease organisms will take advantage of this.

A small, mulched circle under the canopy area of these palms in the landscape is advised. This keeps weeds down and turfgrass from competing with the palm for nutrients. In addition, mulch prevents the trunks from injury from trimmers, mowers, and other lawn-care equipment. In choosing the source of mulch, however, be sure to avoid bagasse (fibrous remnants of sugar cane stalks), as they may contain guava moth larvae.

Propagation and transplanting

Foxtail palms are propagated from freshly collected, mature seeds. Seeds need to be removed from their fruits and scarified either by chipping the seed coat with a knife or rubbing the seed coat with a file or sandpaper, being careful not to apply too much pressure. In a pot at least 6 inches deep, sow seeds horizontally in a porous medium that drains well. A 2:1 or 3:1 mixture of perlite (or vermiculite) and peat will do nicely. Cover seeds with no more than ¼ inch of medium.

Some growers first germinate seeds in sealable plastic containers using the same media as above and transplant them into 6-inch deep pots when their first roots begin to emerge. Other growers germinate seeds under mist in a greenhouse in which the air is already humid. The important thing to remember is that foxtail palm seeds require a moist and humid atmosphere to germinate, so keep the medium moist and the atmosphere humid. In an attempt to generate a humid atmosphere for their seeds, some palm hobbyists have tried using plastic wrap to cover the pots, which has had mixed results. Seeds may take as little as a month or as long as a year to germinate. However, the average germination times ranges from 1 to 3 months. For faster germination, bottom heating with a heating pad set in the range of 86–95°F may be used.

In Hawai'i, where seasonal changes in temperature are not too dramatic, these palms may be transplanted at any time. However, it is best to transplant them during the spring and summer. When transplanting a foxtail palm into the

landscape, care should be taken to be sure that it is planted in a site that can accommodate the spread of its leaves (15–20 ft). A properly sized hole and soil preparation are keys to ensuring its longevity. The hole should be no deeper than the soil in the original pot and twice the pot's diameter. The soil dug up from the hole should be used for backfill. Amending the backfill is not recommended, as this will not permit roots to travel past the area of amended soil around the root ball into the native soil of the site. Prior to placing the palm in the hole, check to be sure that the hole has the proper dimensions of depth and width as described above.

If necessary, refill the hole with soil so that when the palm is placed into the hole, it will be at the same depth at which it was in the pot. Bear in mind that loose soil will settle when it is watered, so lightly compacting the soil in the hole will help to keep the palm from sinking too deep afterward. The palm may now be removed from the pot. When placing the palm into the hole, the base of the palm should not be below soil level. In fact, the base of the palm can be slightly raised above soil level, as watering will cause the palm to settle slightly. Fill around the sides of the hole and root ball, slightly compacting the soil as it is being backfilled. The root ball and surrounding backfill should remain moist but not saturated during the first 4–6 months after installation.

After transplanting, foxtail palms will slow in growth for a time as the plant acclimates to its new environment. In general, newly transplanted, specimen-sized palms will not produce much top growth during the first year after transplanting, as much of the palm's energy reserves will be dedicated to new root growth. A light application of controlled-release fertilizer can be applied to the area above the root ball 3–4 months after transplanting. When new leaves start to appear, a regular fertilizer application regime should commence. Applying mulch to the area beneath the canopy will not only aid in water retention but will enhance weed control as well.

Pests, diseases, and nutrient deficiencies

The banana moth (*Opogona sacchari*) is a fairly recent pest of certain palms, including foxtail palm. Adult moth females lay eggs in natural openings along the stem, in wounds, or even within young heart leaves. Upon hatching, the larvae feed upon and bore holes into the plant where they pupate. Following the emergence of adult moths from the pupae, this cycle can continue on an infested plant. While early stages of larval tunneling are difficult to detect, later stages of damage include decaying leaves that easily pull away from the crownshaft, and heart-leaf necrosis. This pest may be difficult to control because by the time it is detected the damage is usually extensive. Bt (*Bacillus thuringiensis*) products can be sprayed into bored holes, or a systemic insecticide that contains imidacloprid, such as Marathon® 60WP or II, may help control this pest. As with most pesticides, be sure to follow the manufacturer's instructions. Banana moth infestations are more common in nursery situations in which there are many of the same host plants. Infestations are rarely found in landscape situations.

Foxtail palms are resistant to lethal yellows disease, which has not yet been observed in Hawai'i, and they are generally disease-free. Young plants may be affected by leaf-spot fungi, although not consistently. This problem may be linked to frequent overhead irrigation. Thus, watering should be restricted to the drip zone, the area of ground beneath the palm's canopy.

Potassium (K) deficiency may be a potential problem with these palms in the landscape. Symptoms first occur on the oldest leaves as small, translucent, yellow-orange or necrotic spots ($\frac{1}{10}$ inch in diameter) occur on leaflets. As the deficiency progresses, leaflets exhibit necrotic margins that eventually encompass the entire leaflet. However, this is not commonly seen in containerized foxtail palms.

Although not often encountered in the landscape,

iron (Fe) deficiency is a particular problem for foxtail palms grown in pots. Symptoms appear as interveinal or uniform chlorosis on the newest leaves. In severe cases, new leaflets will have necrotic tips. This may be linked to high soil pH, poor aeration, over-watering, or using potting media containing organic components that degrade quickly. Iron deficiency can be prevented by planting these palms no deeper than where they were originally growing and by planting them in a well drained medium or site. For growth in containers, it is best to use potting media with organic components that are highly resistant to degradation in order to maintain good aeration within the pot.

Sometimes this palm may develop what may seem to be a deficiency symptom but is simply a "normal" abnormality. This symptom is more of an aesthetic issue than an actual deficiency of the plant. Black-colored scurf (loose, scaly crust coating) may occur at the base of petioles. This scurf is similar in appearance to sooty mold associated with palm aphids, scales, or mealybugs. This can be easily wiped off, but it goes away as leaves age.

Landscape uses

Foxtail palms are an excellent choice for creating landscapes with a "tropical" feeling, and they can be used in various landscape designs. As a single specimen plant in a small garden, a foxtail palm makes an attractive contribution. Foxtail palms can also be planted in groups as a mass planting. When planted in lines, these palms also are excellent avenue or driveway plantings, creating a regal look. Foxtail palms also can be grown indoors if given enough light and space.

Hybrids of foxtail palms

Foxtail palms have been bred with other palm species from the genus *Veitchia*, resulting in intergeneric hybrids. Although information is lacking for most of these hybrids, some information exists for the hybrid developed by crossing *W. bifurcata* with *Veitchia joannis* from Fiji. This *Wodyetia* x *Veitchia* hybrid has an open crown of arching leaves and shares many characteristics of both parents. It is a fast growing palm that requires a tropical to subtropical climate, full sun, and plenty of water. Its fruits are red at maturity, and its seeds germinate in 3–4 months with bottom heat. This palm also makes a good specimen palm in the landscape.

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